

PHAGO: DIGITAL MEDIA FOR COGNITIVE STRENGTHENING IN THE FIELD OF PHARMACOLOGY

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ABSTRACT

Introduction: In the world of education, studying and learning is required. To keep up with technological advances, learning methods and media are needed that can help students learn. In this research, PHAGO is an interactive learning media which aims to help students understand pharmacology material better and to determine student attitudes and understanding. In this study, the field of urology in geriatrics was chosen because geriatrics is the flagship of FK UKWMS and urology is one of the fields of medicine where geriatric patients often experience disorders.

Purpose: To study the influence of geriatric pharmacology digital interactive learning media in the field of urology on the understanding and attitudes of students at the Widya Mandala Faculty of Medicine, Surabaya class of 2020.

Method: This research method is pre-experimental research with a One Group PrePost Design research design, namely a research design that provides pre- initial test and questionnaire before administering PHAGO and administering the post-test and final questionnaire after administering PHAGO. The sampling technique in this research is simple random sampling. Sampling was the result of random student pre-tests and post-tests by researchers as well as initial questionnaires and final questionnaires. Statistical analysis for this study used the Wilcoxon Test because the data was not distributed normally.

Results: Samples were taken on 21 August 2023 and 11 September 2023 with a total sample of 50 students from the class of 2020 who had never used PHAGO before. The research results obtained are that PHAGO can help students understand pharmacology material and change students' attitudes from being lazy to being more diligent and an increase in the average value from 25.20 to 55.60 also confirmed the effect of PHAGO on student understanding. Wilcoxon test also gives meaningful results ($p = 0.000$).

Conclusion: It can be concluded that PHAGO has had a good influence on FK UKWMS students' class of 2020.

Keyword: studying, learning, attitudes, understanding, digital interactive learning media, geriatric pharmacology in the field of urology

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INTRODUCTION

Pharmacology must be understood by all medical students as the basis for becoming a good doctor, because later they will have to give medicine to patients.^{1,2} Pharmacology came from the words *pharmacon* (drug) and *logos* (science). Pharmacology was divided into two, namely: clinical pharmacology and therapeutic pharmacology. Clinical pharmacology is a pharmacological science that studies the influence of a patient's clinical condition on the effectiveness of drugs. Therapeutic pharmacology is the study of the use of drugs for therapy. According to a textbook from the Ministry of Health of the Republic of Indonesia, pharmacology is a field of medical science that studies drugs, especially the influence of physico-chemical properties in the body, the body's response to the properties of drugs, the fate of drugs in the body, and the use of drugs for healing.³ If you don't understand pharmacology, you won't be able to administer medication correctly.

In the current era, technological developments occur very quickly, especially in information and computer technology⁴. This digital interactive learning field is prepared to provide better understanding for students⁵. Because students had difficulty understanding the material, researchers tried to create a new learning atmosphere for students so they

can study more comfortably. Delivery of material can be done in the form of games and can be packaged in a form that is easier to understand regarding the material to be conveyed.⁴

The Faculty of Medicine, Widya Mandala Catholic University of Surabaya (WMCUS) has a superior field, namely geriatrics.⁶ Therefore, WMCUS Faculty of Medicine students should be able to understand geriatric disorders well. Urology is a branch of medical science that studies diseases and disorders of the male urogenital tract and female urinary tract.⁷

So far, little research has been carried out using digital interactive learning media in the field of urology among medical students, and currently there were many cases in this field. With more research, it is hoped that students will be able to understand innovative solutions in the treatment and prevention of various health conditions related to the human urinary and reproductive systems.

Attitude is a term used in psychology to refer to a person's behavior towards an object. According to the Indonesian dictionary by W.J.S. Poerwodarminto, attitudes can be interpreted as actions that are based on beliefs that arise from the norms that apply in society, including religious norms. However, a person's decision to act usually depends on the

problems they face as well as their beliefs and beliefs. In some situations, attitude can be the most determining factor in human behavior. As a response, attitude is always related to two options, namely liking and disliking an action or event. Therefore, knowledge about something becomes an initial factor that influences a person's attitude which may lead to an action.⁸

In research conducted by Oktavianus, it was found that the indicator of students' initial enthusiasm for interactive learning models was not too low, namely 61% and increased to 82% at the end of the research test⁹. This was also what the researchers hope so that by conducting this research, students at the Faculty of Medicine, Widya Mandala Catholic University, Surabaya can have a more enthusiastic attitude towards studying pharmacology, especially in the field of urology with the help of digital interactive learning.

Researchers wanted to conduct research to determine the effect of interactive digital pharmacology learning on understanding geriatric pharmacology in the field of urology and student attitudes towards pharmacology among FK UKWMS students.

METHOD

This research was a pre-experimental study, intending to analyze the influence of interactive digital learning media on the

attitudes and understanding of students at the Faculty of Medicine, Widya Mandala Catholic University, especially those from the 2020 cohort. The population in this study was all of the students in the 2020 cohort of the Widya Mandala Faculty of Medicine. On the other hand, the samples used in this research were the results of pre-tests and post-tests, as well as the initial and final questionnaires of the 2020 cohort students at the Faculty of Medicine, Widya Mandala Catholic University, Surabaya. The sampling methodology employed in this study was simple random sampling. Samples are obtained through random pre-tests and post-tests, as well as through initial and final questionnaires of the students. Subsequently, the researcher will meticulously compare the results derived from the pre-tests and post-tests. This comparative analysis aims to discern the evolution in students' comprehension and knowledge acquisition. Furthermore, by examining the responses obtained through the initial and final questionnaires, the researcher seeks to gauge changes in students' attitudes throughout the course of the study.

The study was conducted at the Faculty of Medicine, Widya Mandala Catholic University, Surabaya, after it was declared ethically approved by the Medical Research Ethical Commission with the certificate number

0057/WM12/KEPK/MHS/T/2023. The study was carried out from August 2023 to September 2023. Trials are carried out directly to students as followed:

1. Students were asked to fill out the inform consent, initial attitude questionnaire, and pre-test to determine their basic knowledge and attitudes.
2. Students were given a brief introduction about PHAGO and its capabilities.
3. After 21 days, students were asked again to fill out the final attitude questionnaire, and post-test to see how far their knowledge and attitude

RESULT

Populations Characteristics and Research Locations

This research took place at Widya Mandala Catholic University Surabaya in Pakuwon City, located on Kalisari Selatan Street No.1 Kalisari, Pakuwon City, Mulyorejo District, Surabaya City, East Java. The study specifically targeted students who were part of the 2020 cohort at the Faculty of Medicine within the university. The sampling approach used in this research used a simple random sampling technique. The primary selection criteria for inclusion in this research involved the performance in both pre-tests and post-tests, as well as the responses

changes after using PHAGO.

4. Upon the culmination of the data collection phase, a meticulous review will be conducted to verify the completeness and alignment of the content with the specified research criteria. Subsequently, the collected data will undergo the process of being input into the advanced Statistical Product and Service Solution (SPSS) program. The processed data is then presented, followed by an analysis in accordance with the research objectives.

provided in the initial and final questionnaires completed by students from the 2020 class at the Faculty of Medicine, Widya Mandala Catholic University of Surabaya (WMCUS).

Populations Characteristics and Research Locations

Evaluation using a feedback questionnaire on PHAGO users was carried out by 50 respondents. Data shows a change in student attitudes after using PHAGO. In the field of discussing pharmacology on campus, in the statement of students discussing pharmacology with friends on campus, before giving PHAGO

there were 23 (46%) respondents who often discussed pharmacology with friends on campus and 18 students (36%) did not discuss pharmacology with friends in campus. After giving PHAGO, 33 students (66%) agreed that they still discussed pharmacology with friends in campus and 12 students (24%) still did not discuss pharmacology with friends in campus. It can be seen that there was an increase of 20% in students who agreed that they discussed and a decrease of 12% in students who did not discuss.

For the statement that students interacted to discuss pharmacology with friends on campus, before giving PHAGO, there were 22 students (44%) agreed that they interacted to discuss pharmacology with friends on campus and 14 students (28%) disagreed if they interacted to discuss pharmacology with friends on campus. After giving PHAGO, there were 30 students (60%) who stated that they still interacted discussing pharmacology with friends on campus, while 11 students (22%) still did not interact discussing pharmacology with friends on campus. From the results obtained, there was an increase of 16% in students who interacted discussing pharmacology with friends on campus and a decrease of 6% in students who did not interact.

In the field of student attitudes towards pharmacology questions and

material, in the statement that students could understand pharmacology material, 22 students (44%) stated that they could understand pharmacology material and 17 students (34%) could not understand pharmacology material. After giving PHAGO, it was found that 40 students (80%) could understand the pharmacology material and 5 students (10%) still could not understand the pharmacology material. From the results above, it was found that there was a significant increase in students who could understand pharmacology material by 36% and a significant decrease in students who could not understand pharmacology material by 24%.

The next statement is about students not being able to solve pharmacology problems. Before giving PHAGO, 20 students (40%) stated they could not solve pharmacology problems after receiving the lecture system provided by the campus and 19 students (38%) stated they could solve pharmacology problems after receiving the lecture system provided by the campus. Meanwhile, after receiving PHAGO, it was found that 24 students (48%) were able to solve pharmacology problems well and there were 13 students (26%) who were still unable to solve pharmacology problems. From these results, it was found that there was an increase of 10% in students who could solve pharmacology problems well and a decrease of 14% in students who were

still unable to solve pharmacology problems.

The next statement is about students looking for reasons not to study pharmacology. Before giving PHAGO, there were 20 students (40%) who did not look for reasons not to study pharmacology and 14 students (28%) looked for reasons not to study pharmacology. Meanwhile, after giving PHAGO, 28 students (56%) did not look for reasons not to study pharmacology and 10 students (20%) still looked for reasons not to study pharmacology. There was a significant increase of 16% in students who were not looking for reasons not to study pharmacology and a decrease of 8% in students who were still looking for reasons not to study pharmacology.

For students' attitudes towards pharmacology outside class hours, in the statement that students liked to read pharmacology material outside class hours, before giving PHAGO, it was found that 27 students (54%) stated that they did not like reading pharmacology material outside class hours and 11 students (22 %) likes to read pharmacology material outside class hours. Meanwhile, after giving PHAGO, 24 students (48%) preferred to read pharmacology material outside class hours and 15 students (30%) still did not like reading pharmacology material outside class hours. From these results, there was a

significant increase of 26% in students who read pharmacology material outside class hours and a decrease of 24% in students who still did not like reading pharmacology material outside class hours.

The next statement is regarding students not diligently studying pharmacology privately at home. Before administering PHAGO, it was found that 26 students (52%) agreed that they were not diligent in studying pharmacology privately at home and 16 students (32%) disagreed that they were not diligent in studying pharmacology privately at home. Meanwhile, after receiving PHAGO, it was found that 9 students (18%) still agreed that they were not diligent in studying pharmacology privately at home and 27 students (54%) were diligent in studying pharmacology privately at home. There was an increase of 22% in students who were diligent in studying pharmacology privately at home and a decrease of 34% in students who were still not diligent in studying pharmacology privately at home.

Statement regarding students taking time to study pharmacology at home. Before giving PHAGO, 20 students (40%) stated that they did not take time to study pharmacology at home and 18 students (36%) took time to study pharmacology at home. After giving PHAGO, there were 26 students (52%) who took the time to study pharmacology at home and 16 students

(32%) who did not take the time to study pharmacology at home. From the results above, it was found that there was an increase of 16% in students who took the time to study pharmacology at home and a decrease of 8% in students who did not take the time to study pharmacology at home.

Regarding student attitudes in the pharmacology lecture process, in the statement that students were unable to follow the pharmacology lecture process, before giving PHAGO, 24 students (48%) thought they were able to follow the pharmacology lecture process well and 15 students (30%) thought they were unable to follow the process pharmacology lectures. After giving PHAGO, 25 students (50%) were able to follow the pharmacology lecture process well and 6 students (12%) were still unable to follow the pharmacology lecture process. From the results above, it was found that there was an increase in students who were able to follow the pharmacology lecture process well by 2% and a decrease in students who were unable to follow the pharmacology lecture process by 18%.

The next statement is regarding students not being able to concentrate during the pharmacology lecture process. Before administering PHAGO, 25 students (50%) stated that they could concentrate during pharmacology lectures and 14 students (28%) could not concentrate

during pharmacology lectures. After administering PHAGO, 26 students (52%) were able to concentrate during pharmacology lectures and 14 students (28%) were still unable to concentrate during pharmacology lectures. From these results, it was found that there was a very slight increase of only 2% in students who were able to concentrate during the pharmacology lecture process and there was no decrease or increase in students who were unable to concentrate during the pharmacology lecture process.

Student Knowledge Data

Table 1. Distribution of Pre-Test dan Post- Test Score

	Pre-test	Post-test
Mean	25.20	55.60
Median	20.00	40.00
Minimum	0	0
Maximum	80	100
Std. Deviation	20.321	36.724

The pre-test and post-test to evaluate respondents' (students') understanding were carried out offline and contained 5 questions which were carried out on 21 August 2023 and 11 September 2023. The results can be seen that the mean and median increased after administering *PHAGO*.

Based on the results of the data normality test, it can be seen that the pre-test and post-test value data are not normally distributed.

Tabel 2. Normality Test Results

	Saphiro-wilk
Pre-test Sig.	.002
Post-test Sig.	.002

Therefore, overall data analysis using the Wilcoxon test was carried out.

Table 3. Wilcoxon Test Results

	Pre-Test & Post-Test
Asymp.Sig. (2-tailed)	.000

The test results showed that there was a significant difference between the pre-test and post-test for 50 respondents ($p = 0.000$).

DISCUSSIONS

Learning Knowledge

The results of the pre-test and post-test carried out by students showed a significant improvement. The average score obtained by students before the intervention (*PHAGO*) was 25.20, with the majority of scores ranging between 20 and 40. After the intervention (*PHAGO*), the average score increased to 55.60, and most students achieved scores between 20, 40, and 100. The median data also saw an increase, initially at a value of 20 and rising to 40.

By using learning media, material that was initially abstract for students can become more concrete (real) so that it is easier to understand¹⁰. According to research conducted by Asy'ari, digital interactive learning media is a form of learning media that utilizes digital technology to produce an interactive

learning environment and supports a more effective learning process¹¹.

The study also highlights that the technological advancements can be utilized to create applications that support the learning process. The learning media (*PHAGO*) was proven to engage students in studying and comprehending pharmacology materials, as well as training them in problem-solving through the cases provided within the application. Easy accessibility is another factor contributing to students' improved understanding because *PHAGO* can be accessed anywhere via mobile devices.

This aligns with the research conducted by Dr. Bernadette Dian Novita Dewi, which also showed an improvement in the final results of the respondents⁴. In that study, the initial test score was 32.98 and increased to 48.09 in the final test⁴. This research proves that with the right tools, such as learning media, students can study more diligently and improve their understanding⁴.

Attitude

The This study showed positive changes in attitudes and increased students' understanding of pharmacology after being given *PHAGO*. In this research, there were various results from the attitudes of the students who were respondents. In the first and eighth statements which contained

student attitudes in discussing and interacting to discuss pharmacology on campus, it was found that there was an increase of 20% in students who discussed and an increase of 16% in students who interacted. Before administering PHAGO, 46% of students discussed pharmacology and 44% of students interacted. Meanwhile, after administering PHAGO, an increase was found to be 66% in students who discussed and 60% in students who interacted. This increase proves that a person's attitude can develop for the better if they get the right learning media, because by getting an appropriate way of learning, students have the desire to discuss learning results and interact with friends. Quoted from research by Saputri, it is necessary to provide interactive learning using multimedia¹². Teachers must be creative and innovative so that students want to learn more¹². Providing PHAGO in this research was proven to be able to improve students' attitudes towards discussing and interacting regarding pharmacology on campus.

In the second, sixth, and seventh statements regarding student attitudes towards pharmacology questions and material, there was an increase of 36% in understanding pharmacology material, 10% of students became able to work on pharmacology problems, and 16% of students no longer looked for reasons to

study pharmacology. Before giving PHAGO, only 44% of students could understand pharmacology material, 38% of students could work on pharmacology problems, and 40% of students were not looking for reasons to study pharmacology.

After giving PHAGO, it was found that 80% of students could understand pharmacology material, 48% of students could work on pharmacology problems, and 56% of students who were not looking for reasons to study pharmacology. This increase can occur because PHAGO becomes a fun learning media for students so that students get an exciting experience for them and gain knowledge about the material provided so that students can more easily understand pharmacology material⁸. By using PHAGO, students' learning intensity will increase so that more students will not look for reasons to study pharmacology⁸. With increasing understanding and intensity of student learning, students in working on pharmacology questions will become better.

In the third, fifth, and ninth statements regarding students' attitudes towards pharmacology outside class hours, there was an increase of 26% of students who liked to read pharmacology material outside class hours, 22% of students became diligent in studying pharmacology privately at home, and 16% students spend

time studying pharmacology at home. Before giving PHAGO, only 22% of students liked to read pharmacology material outside class hours, 32% of students studied diligently privately at home, and 36% of students took their time studying pharmacology at home. After giving PHAGO, students who liked to read pharmacology material outside class hours increased by 48%, students who studied diligently at home became 54%, and students who took time to study pharmacology at home became 52%. With the increase that has occurred, it can be seen that PHAGO has an influence on the attitudes of students who study more often and spend more time studying pharmacology⁸.

In the fourth and tenth statements regarding student attitudes in the pharmacology lecture process, there was no significant increase because each statement only increased by 2%. Before giving PHAGO, 48% of students were able to follow the pharmacology lecture process and 50% of students were able to concentrate during the pharmacology lecture process. Meanwhile, after giving PHAGO, 50% of students were able to follow the pharmacology lecture process and 52% of students were able to concentrate during the pharmacology lecture process. This can prove that PHAGO does not have much influence on

students' attitudes during the lecture process because the lecture process is a process that occurs between lecturers and students without the involvement of PHAGO. PHAGO does not have much influence because it is not directly involved in the lecture process so that the student's attitude is an internal state of the student towards an object, which in this case is a pharmacology lecture⁸.

The Influence of Pharmacology Interactive Digital Media on Attitude and Understanding Learning Pharmacology

The Wilcoxon test analysis showed a significant difference ($p = 0.000$) between the results of student respondents before and after the intervention. Using digital media had a positive impact on educators and students at the Faculty of Medicine, Widya Mandala Catholic University, Surabaya. pre-test and post-test scores increased significantly from 25.20 to 55.60, indicating improved learning knowledge and attitude changes.

CONCLUSIONS

In this research, there is a significant relationship between pharmacology interactive digital media on with understanding and attitude of student class of 2020, UKWMS Faculty of Medicine.

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